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BIONOMIA

Φημι δεδειν τον μελλοντα ορθως ξυγγραφειν περι
δαιτης ανθρωπινης, πρωτον μεν παντος Φυσιν
ανθρωπου γνωναι και διαγνωναι.—Porro eum,
qui de victu humano scripturus est, censeo primum
quidem totius hominis naturam nosse ac dijudicare
oportere.—HIPPOCRATES.

SANABILIBUS ÆGROTAMUS MALIS, IPSAQUE NOS IN REC-
TUM GENITOS NATURA, SI EMENDARI VELIMUS, JUVAT.

BIONOMIA

OPINIONS

CONCERNING

LIFE AND HEALTH,

INTRODUCTORY TO

A COURSE OF LECTURES

ON

THE PHYSIOLOGY OF

SENTIENT BEINGS.

ΓΝΩΘΙ ΣΕΑΥΤΟΝ.

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PREFACE.

AT a time when Philosophy appears to be almost totally immersed in the consideration of matter, and its various modifications, it will, I hope, be deemed no improper attempt to call some share of the public attention to the study of that class of natural phenomena which are connected with the influence of the principle of LIFE.

Of the nature of the living principle, considered in its essence, I profess to know nothing. To discern things in their causes does not appear to be within the scope of human attainment. *Pre-tiossimum est intelligere quemque nescire se quod nesciat, semperque cupere quod ignorat addiscere.** This kind of ignorance constitutes, indeed, the

* COLUMELLA DE RE RUSTICA. lib. ix.

true foundation of knowledge. Nature is ever consistent with herself, and a reliance on this uniformity of action sufficiently warrants an attempt to investigate the laws according to which the economy of organized beings, endued with the principle of life, is regulated. The cause of gravitation remains unknown ; but ignorance of that cause has been found no bar to the improvement of physical astronomy ; which, founded upon the acknowledged universal operation of the principle of gravity, forms the most correct, and useful, as well as beautiful department of science hitherto explored by the powers of the human understanding.

Reasoning, strictly speaking, is perhaps solely applicable to the truths of geometry, where the connection, and immediate dependence, of every step of a demonstration, must be perceived in order to be understood. In discussing a subject concerning which so little, comparatively speaking, is known with certainty, as the functions of the animal economy, reasoning equally accurate is

hardly to be expected. Hence, the mode in which I have ventured to offer my OPINIONS on the Philosophy of Life, will be found in some measure detached, and occasionally they are stated merely in the form of queries. An additional obstacle to the promulgation of this branch of science, occurs in the want of any general knowledge, or correct ideas, of the energies of the principle of animation. It is difficult, indeed, to convey notions concerning a subject that has been so little attended to, as the effects of the vital principle, in terms that will be generally comprehended. I do not, indeed, expect to be fully understood, except by minds that have been, in some measure, already awakened to analogous trains of thought ; for of knowledge language is but the medium, as light is of vision, the rays of which produce correspondent images only when reflected by mirrors of similar structure and form.

Every attempt to point out the value of health and the means of preserving it, must necessarily tend to inculcate the virtues of temperance and self-

command ; while a steady attention to the influence of the vital principle can hardly fail to inspire the mind with a just reliance on the sanative efforts of Nature.* On this foundation may be reared an useful barrier against the prevalent propensity of introducing precarious or dangerous remedies, which owe their chief recommendation to their novelty ; and a proper opinion will, perhaps, ultimately be formed concerning the value of the interference of art, as well as a more accurate estimate of its real utility in the treatment of disease.

* Quid enim aliud est natura quam Deus, et divina quædam ratio, toti mundo et partibus ejus inserta ?

SENECA

PERCY STREET,
LONDON, 1811.

OPINIONS.

1. THE contemplation of Nature presents to the mind of man a perpetual succession of changes or events.

2. The subject of these changes, **MATTER**, is known by the properties of solidity, inactivity, and divisibility.

3. But every change implies motion; the doctrine of motion has, therefore, been justly termed the key to the knowledge of Nature.

4. The motions which we perceive to be constantly going on around us, are of two kinds ;— First, the movements of the larger masses of matter, subject to the laws of mutual attraction, apparently modified in the reciprocal relations of their more minute particles by the influence of heat.—Secondly, The motions of organized bodies endowed with the principle of life, which are denominated actions.

5. The connection of the principle of life with the organic forms to which it imparts activity, experience proves to be only temporary ; and, when deprived of it, they soon return to the common condition of inert matter.

6. Motion we observe to be communicated from one body to another, and the principle of vital energy to be transmitted from generation to generation of animated existence, but the spontaneous commencement of either of these species of motion cannot in any instance be traced by man.

7. Hence it may be inferred, that we cannot expect to discover the nature of these phenomena by inquiries concerning their origin, although we may justly hope to obtain some knowledge of the laws according to which they are regulated, by attending to the appearances exhibited in their various transitions. To compare and arrange the series and order of these changes, constitutes the proper object of philosophy.

8. From observing the exertions of animated beings, together with the consciousness we possess of being able to control our own actions, we obtain the notion of power, or force, which in all cases appears to be derived from the principle of life.*

9. But as man is led by an instinctive principle to consider every change as an effect implying the agency of a cause, the motions of the

* Note A. .

planets, and all the changes displayed in the course of nature, are, like the actions of living animals, ascribed by him to some principle distinct from matter; and hence originates the idea of MIND, essentially active, percipient, and indivisible.

10. To a supreme MIND, possessed of infinite power and wisdom, man attributes the creation and superintendence of the universe.

11. Mind and matter appear to be equally durable. The powers of nature can neither augment nor diminish the stock of beings, although their forms may be infinitely modified. What has existence, cannot be annihilated, and what is one cannot be divided.* *Omnia mutantur, nil interit.*

12. The presence of life is indicated by sensation. It is impossible, even in imagination, to

* TUCKER'S *Light of Nature*, article MIND.

separate the notion of feeling from animal existence. But with sensation there is always combined the power of self-motion. Nature has not been so unjust as to impart the susceptibility of pain, without also furnishing the means of avoiding the cause of it.*

13. Sensation and motion enter into our most simple notions of animal life. But the existence of these faculties always implies organic structure. That modification of animal matter, in which sensation appears peculiarly to reside, is termed nervous. The more simple species of zoophytes, as the polypi, may be considered as consisting totally of nerve. Without disparity of parts, the living principle seems equally diffused throughout the whole of their simple structure ; so that, when subdivided, each separate

* *Lapides crescunt ; vegetabilia crescunt et vivunt ; animalia crescunt, vivunt, et sentiunt.* LINNÆUS, and note B.

portion, closing on itself, soon becomes fit to perform all the functions of a complete animal. The pain instantly perceived from irritation, even by the finest point applied to the surface of the body, affords sufficient proof that a homogeneous sentient substance is diffused over every part of the largest and most complicated animal.

14. According to a law of nature, every animated being requires perpetual reparation, by fresh supplies of matter, which are retained in temporary union, by the plastic power of life. It is the presence of the principle of animation which imparts individuality. The component parts of all living bodies are in a state of perpetual secretion.* For the purpose of containing a proper quantity of the materials, whence this accretion of new matter is derived, all animals are provided with an internal cavity, termed the stomach; an organ subordinate to the faculty of loco-motion. By this peculiarity of structure, the animal is distinguished from the vegetable

kingdom. Plants are immovably attached to the ground from which they derive their nutriment, by means of their roots.

15. Another condition, essential to the existence of animal life, is a communication with the atmospherical air. In the earliest rudiments of animal existence, some contrivance for maintaining an intercourse with the external air may be detected. It was at a very early period observed, that somewhat necessary to vitality was derived from the air, which the ancients termed the *pabulum vitæ*. The demand for fresh supplies of air varies much in the different periods of existence of the same animal, and still more in the various classes of animated beings ; but a full and free respiration of pure air is absolutely necessary to support the health and vigour of the more complex and perfect animals.

16. The substances which, after having imparted the principles requisite for the support of life, become effete or noxious, are expelled from

the animal system by various processes of secretion.

17. Respiration, accretion or digestion, and secretion, complete the circle of the animal economy ; and as these functions appear to be essentially necessary to the existence of the sentient principle of life, they are denominated the vital functions. The influence of the living principle is again absolutely requisite to maintain their agencies ; for, if the communication of the nervous power with any organ of the living body be intercepted, by compressing or dividing the nerve through which it passes, that organ will soon cease to perform its proper office.

18. By sensation, animated beings are connected with external nature. Resistance, perceived by means of the touch, which may be termed the universal sense, informs us, that something exists besides ourselves. By the organs of the different senses we become acquainted with

other properties of matter, through the intervention of certain media. To excite the perception of taste or smell, there must previously be a solution in water, or in air. Sound is transmitted by the vibrations of air; and sight is produced by the impression of the rays of light upon the eye.

19. Animals are induced to procure fresh supplies of the materials requisite for the support of life [14] by the influence of appetite. And the various contrivances for loco-motion with which they are furnished, are, in a state of nature, found to be chiefly adapted to the purpose of obtaining their proper food.

20. By instinct animals are directed with certainty to discover the objects properly suited to repair the waste of life in the various conditions of their existence. By an appetite still more powerful, but which remains dormant until the individual has attained the perfection of its growth, they are irresistibly urged to

the multiplication of their species. To the force of this impulse, and the protection of their young, even the principle of self-preservation yields a temporary sway. The hostility and contentions of the males, and the various weapons of offence which they possess, are circumstances obviously subservient to the general melioration of the respective species of animated beings.*

21. By the influence of Instinct the animal kingdom of nature is sustained in perpetual youth, beauty, and perfection. Individuals perish in countless multitudes, while the integrity of the genera is preserved, and the several species are collectively improved.

22. In addition to the sentient principle by which the animal is distinguished from the vegetable, man is moreover endowed with a rational soul, manifested by the significant sign of articulate speech. ‘The substance of the soul was not in

* Note D.

the creation extracted out of the mass of heaven and earth by the benediction of a *producat*, but was immediately inspired by God.* And the LORD God formed man of the dust of the earth, and breathed into his nostrils the breath of life, and man became a living soul ! The excellence of the mind of man is indeed manifest in the expression of his countenance—the image of God. The senses only transmit particular notices ; it is the mind which infers the existence of a whole. That which appears merely a coloured surface to an animal, to man presents an intelligible picture. However we may admire the sagacity of some animals in the construction of their habitations, or the ingenuity displayed by others in contrivances for inveigling their prey, it ought to be remembered, that these purposes have been executed by every succeeding race with equal precision and uniformity ; whereas the possession of the intellectual facul-

* *Atque, quoad animam rationalem in homine, certo certius est eam nec ex traduce esse, nec reparari, nec interire.*

ties of memory and reflection have enabled mankind to carry the arts of invention and improvement to an extent, of which the limits recede in proportion as the state of civil society advances. The dominion which man maintains over every living thing that moveth on the earth, is not due to the greater strength of his body, but to the superior powers of his mind.

23. To man alone is given the capacity of comparing the relations of matter, space, and time, by means of weight, measure, and number;*---means which have enabled him to discover the laws of the operation of that energy which guides the planets in their orbits, and regulates the motions of the universe. It is the spirit of man which is the lamp of God, that bestows on him the peculiar privilege of apprehending the perfection, while he contemplates the beauty of nature, and of glorifying the creator in the admiration of his works.†

νοὺς ὁρᾷ, καὶ νοὺς ἀκούει· τ' ἀλλὰ κωφὰ καὶ τυφλὰ.

* Pondere, mensura, et numero, DEUS omnia fecit.

† Note E.

24. The faculties of the human mind have been applied with success to the investigation of the properties of matter. The arts of chemistry and mechanics have been diligently cultivated; by their means the control of man over many departments of the productions of nature has been extended and confirmed, and some of the most stubborn and untractable material bodies rendered subservient to his use or conveniency.

25. But amid the rich harvest of discovery which has of late been reaped from inquiries directed towards the most immense, as well as the most minute departments of nature, the knowledge of the being by which they are made,—an acquaintance with the organization of that most curious structure, the living tabernacle of the soul, seems in a great measure to have fallen into neglect.

26. The intellectual faculties, and the moral duties of man, are generally allowed to be the most interesting and important objects of human inquiry; and an acquaintance with these

branches of science has been supposed to include the whole of what has been denominated the knowledge of ourselves. But as, during life, the organized body is ordained to form the medium between the mind of man and external nature, some share of information concerning the organization of its component parts, deserves also to be considered, as an important department of SELF KNOWLEDGE.

27. In the distribution of the various branches of knowledge, adopted by LORD BACON, he has particularly designated “human philosophy, or the knowledge of ourselves; that knowledge whereunto the ancient oracle directeth us, which deserveth the more accurate handling, as it toucheth us the more nearly.” Notwithstanding a recommendation of such high authority, and the obvious interest of the inquiry—for the most important business of man is with himself,---the nature of the animal œconomy has never excited general curiosity, and mankind appear inclined

to study any kind of knowledge, rather than the knowledge of themselves.*

28. The operations of physical causes are, in a variety of instances, suspended or controlled by the principle of life, which, to a certain extent, seems to exempt the organic forms with which it is connected, from the influence of chemical or mechanical agency.—Vegetables spring upwards from the ground in direct opposition to the tendency of gravitation.—A living creature is not sensible of its own weight.—And man, the chief of animals, touches the earth with little more than the termination of his inferior extremities.

29. Neither are the fundamental laws of material motion applicable to the actions of animated beings. The effect produced, by a stimulant acting on the living body, is not in the ratio of the intensity of its impulse, but in

* Note F.

proportion to the vital susceptibility of the animal on which the experiment shall be made.

30. The operation of chemical agents is, in like manner, modified by the presence of the principle of vitality. A living animal can maintain its proper temperature, and resist the impressions of both heat and cold, to a very considerable extent ; and the action of a chemical solvent is also resisted by the powers of life. Certain extremes of heat or of cold are, indeed, inconsistent with animal existence, and an active caustic occasions the death of the part to which it is applied.

31. External impressions must, therefore, be considered as at all times operating on the living body, in concurrence with the internal self-regulating principle of life, and the results of their co-operation may be termed physiological changes. [3] But the causes of these

changes are not inseparably conjoined with their effects, as in the case of physical causation; nor are they connected through the medium of volition, as actions are with motives; but, their influence varying in relation to the state of the vital principle, they may be distinguished by the appellation of *occasional*, or *exciting causes*.

32. The peculiar nature and the limits of this class of causes, are aptly illustrated by the phenomena, which occur during the development of the embryo animal or plant. If a recent egg be exposed to a certain degree of warmth, or a ripe acorn to a proper share of heat and moisture, a young animal or plant will in due time be evolved. But if the seed or the egg has been previously deprived of the principle of life, or the degree of heat to which either is exposed, exceed certain limits, results of a very different kind will be the consequence.*

* Philosophical Essays by Dr. J. GREGORY.

33. One purpose of the present attempt, is to recall the attention of those persons who at present devote part of their leisure to the pursuits of science, to the peculiar nature and agency of that species of causation by which the phenomena of animal life are influenced and regulated, and which may be considered as forming an intermediate step, or, perhaps, a connecting link, between the philosophy of matter and that of mind.

34. The general neglect of this department of the knowledge of nature, the study of which has hitherto been almost exclusively confined to men of a certain profession, seems to disclose the real source of much erroneous reasoning respecting the principles of human conduct : Without regard to the peculiar modification of the relation of cause and effect by the presence of the vital principle, the laws of physical causation have been immediately transferred to the actions of reasonable beings.

35. The different branches of science appear to have attracted the attention of mankind, in the progressive order of their usefulness. To an agricultural people, the necessity of determining the boundaries of landed property, must have at an early period suggested the rudiments of geometry. And the obvious utility of ascertaining the periodical returns of the seasons would soon attract their attention to the position of the stars, by which their revolutions are indicated, and thus lay the foundation of the science of astronomy. But the functions of living animals being either less immediately interesting, or of more difficult investigation, never appear to have engaged general attention.

36. The study of the physiology of sentient beings has therefore always been confined to those persons who professed the art of curing diseases. With a view to augment the estimation in which they were held by those who employed them, the practitioners of medicine very early pretended that their profession was peculiarly mysterious.

But mystery, when applied to the phenomena of nature, is only an apology for ignorance. The appearance of wisdom is indeed conferred by preserving silence respecting matters which we are unable to explain. And, as it is always more easy to affect mystery, than to interrogate, or even to observe nature, those who pretend to understand the functions of the animal œconomy, and to restore their healthy action when deranged by disease, have in all ages found it convenient to separate their professional studies, by a kind of mysterious veil, from the other branches of natural philosophy. “For in all times,” Lord BACON observes, “in the opinion of the multitude, witches and impostors had a competition with Physicians, and the ancient poets were clear sighted in discerning this extreme folly, when they made ÆSCULAPIUS and CIRCE both the children of APOLLO.

37. The exquisite contrivance displayed in the formation of the animal body, and the energies of the internal vivifying principle,

particularly as evinced in the œconomy of the human automaton,* the power it possesses of retaining in harmonious union the discordant principles entering into the composition of the body, and of resisting the tendency to putrefactive fermentation in circumstances highly favourable to the commencement of that process,—in compensating various irregularities of action,—repelling different external impressions of a deleterious kind,—and expelling from within matters of a noxious nature,—in rectifying the derangements occasioned by disease,—in the healing of wounds,—the re-union, and strengthening of fractured bones,—the faculties of self-motion, self-repair, and reproduction, are operations so truly wonderful, that it is not surprising to find their more early observers

* This term has been misapplied to artificial machines, of which the movements are always borrowed from, and must occasionally be renewed by, some external agent. It is the internal self-regulating principle of the animal body which properly entitles it alone to the appellation of an automaton.

inclined to refer them to the immediate interference of supernatural agency.

38. Wonder is the offspring of ignorance. When a phenomenon can be explained, that is, referred to some general law of nature, with the operation of which we are already acquainted, men cease to wonder. But as the laws of life have never yet become the object of general attention, mankind in former days believed certain diseases to be the acts of evil spirits, as at present they are inclined to attribute their cure to any mysterious and unintelligible influence, rather than to the sanative powers connected with the vital principle. Hence the belief that so long prevailed of various complaints being removed by the touch of certain individuals, plebeian as well as royal; the implicit faith in the tricks of animal magnetism; and the more recent imposture of metallic tractors. The grossness of these and many similar impositions, proves that the credulity of the multitude is by no means in

proportion to the craft of the impostor, but in the ratio of their own ignorance.*

39. The mischievous consequences of medical imposture are extensive and serious. Not only are valuable lives sacrificed to misplaced confidence, but the human mind is enfeebled and debased by the exaggerated fears and delusive hopes excited, as the means of recommending these nostrums. Life is thus rendered miserable, and the terrors of death are augmented. The magnitude of the evils emanating from this source appears at present indeed to be duly appreciated, although different opinions may be entertained respecting the most effectual means of counteracting them.

40. The only efficient mode of eradicating empiricism from the science of medicine has always appeared to me to be the same which experience has shewn to be successful in emancipating other departments of human knowledge from the trammels of imposture, and the dominion of ignorance.

* Note H.

41. The degree, in which the minds of men were enslaved during the dark ages, by the influence of judicial astrology, is now hardly credible. No enterprize could be undertaken, far less prosper, without the sanction of the soothsayer. Diseases were not then attributed to any derangement of the animal œconomy, but to some malignant aspect of the stars; and the salutary virtues of herbs were ascribed, not to any peculiar properties they might possess, but to the influence of the planet under whose ascendant they were collected. But since the laws of the motions of the celestial bodies have been ascertained, while the prediction of future events by the real astronomer surpasses even the vain pretensions of astrology, the minds of men are no longer shackled by the belief that their moral conduct is controlled by the positions of the planets.

42. Faith in the rites of magic, together with all the train of ghosts, spectres, and

witches, which haunted the imaginations, and, doubtless, often embittered the existence of our more immediate ancestors, have vanished before that light which has been diffused by the more general cultivation of natural and experimental philosophy.

43. The golden dreams and vain delusions of the Alchymist are indeed almost forgotten since chemistry has been cultivated as a rational science, but much knowledge of a more useful kind has been spread abroad. For were it even practicable to render the more precious metals equally common with iron or lead, the public wealth would not be augmented; but when the hand of labour is guided by the light of science, an increase of national prosperity and individual happiness may confidently be expected.

44. It will hardly be denied, in these realms at least, that since the people assumed the privilege of thinking for themselves in that most

important of all concerns, religion, the faculties of the human mind have expanded with almost unpreccedented elasticity : Nor has the general improvement of public morals been less conspicuous. May the efforts, unparalleled in any age or country, now making to impart the advantages of education to the youth of all classes of society, succeed in still farther promoting these desirable objects.

45. Were the fundamental principles of that general plan of organization, which, variously modified, seems to pervade the whole of the animal kingdom of nature, pointed out, the particular class of phenomena connected with the presence of the vital principle rendered more familiar to the mind, the influence of external impressions requisite for the support of life, and the astonishing compensatory powers of the constitution better understood, analogy authorises us to conclude that the extent of the control assumed by man over the functions of the animal œconomy, in the state of health and of disease, would be more correctly

appreciated. Pretensions to work miraculous cures by concealed and apparently inadequate instruments would be exploded. A just confidence in the healing energies of nature, under the guidance of science instructed by experience, would take place of the present prevalent belief in the potency of drugs ; and the art of preserving health, and of treating disease, would truly deserve to be considered as a department of liberal science.

46. The distrust very generally entertained, or at least expressed by persons in health, respecting the effective powers of medicine to relieve disease, is chiefly derived from the pretensions of the professors of that science to produce effects by means in which no known analogies lead mankind in general to confide. Under the influence of disease the care of life must often be entrusted to some person of whose deserts the patient can form no just estimate. The principle of self-preservation, will always induce the afflicted to put their con-

fidence in the man whom they conceive best
 deserving of it. And in proportion as more
 correct notions of the phenomena dependent
 on vitality are diffused through society, the
 relative merits of the professors of the healing
 art will be more justly appreciated. The respec-
 tability of the profession in general will thus be
 augmented, and the members of it will be
 induced to study their occupation with more
 diligence, when they find success to be con-
 nected with liberal conduct, real information,
 and sound judgment. As the rewards and
 honours of medicine are now distributed, the
 physician may often with too much truth apply
 to himself the words of the preacher. *For, if
 it befall me even as it befallerh to the fool, why
 should I labour to be more wise.*---“ If we consi-
 der,” says Dr. GREGORY, “the situation of a phy-
 sician of genius, brought forward and supported
 in his profession under the honourable patronage
 of those who are judges of that genius : and
 that of another, destitute of such assist-
 ance, and compelled by necessity to attend to

the prejudices, and to humour the caprices of the ignorant and impertinent intruders into his office,---how pleasant, how creditable is the one,---how humiliating the other, to every man of spirit and sensibility !”*

47. That some acquaintance with the functions of the animal œconomy has never hitherto been considered as being a part of liberal or useful knowledge, is probably not so much to be attributed to any want of curiosity respecting the subject, as to the general abhorrence excited by the ideas connected with practical anatomy, which has been considered as an essential preliminary to an acquaintance with the physiology of animal bodies. The properties of organized beings exciting that class of mental emotions which entitle them to the appellation of beautiful, are immediately derived from the principle of ani-

* Lectures on the duties and qualifications of a Physician by JOHN GREGORY, M. D.

mation. Not only is all interest in our fellow creatures terminated by the extinction of life, but the circumstances attendant on the resolution of the inanimate body into its constituent elements, are so disgusting as to render the process of examining its structure by dissection repugnant to the best feelings of human nature. But a minute acquaintance with structure is by no means requisite to comprehend the influence of the vital principle to which organization is ever subservient. As the most attentive examination of the various parts making up a watch, of which the mainspring had been deprived of elasticity, would never lead to the discovery of the principle which renders such a machine, when perfect, fit to measure the lapse of fleeting time, so the most accurate acquaintance with the organic structure of an animal body imparts no knowledge of the agency of the principle of vitality.

48. In the formation of the bodies of animals, as in every other department of nature,

we perceive an infinite variety of modifications originating from few and simple principles. A general plan of organization pervading the whole extent of animated nature, appears to be accommodated by various adaptations to the different conditions of animal existence. These general principles it is certainly necessary and not very difficult to comprehend. Without questioning the utility of anatomical knowledge to the surgeon, I am of opinion that too minute attention to structure tends to impede the improvement of practical medicine, by diverting the attention from the living principle through the medium of which alone are we enabled to operate any alterations on the functions of the animal œconomy. *Medicamenta non agunt in cadaver.*

49. Possessing comparatively slender knowledge of the organization of the human frame, but assiduously attentive to the vital phenomena in health and in disease, the physicians of antiquity appear to have been equally

successful in their treatment of the sick, with those of more modern times. The accuracy of their observations of nature, and fidelity in detailing their experience, are sanctioned by the esteem in which the works of the fathers of physic have been held, during the lapse of ages, while numberless medical theories have passed into successive oblivion. Dissection discovers the consequences, but rarely the causes of disease

50. The study of the animal economy has been almost entirely confined to the members of a profession who have been obliged to consider their knowledge of the vital functions as wholly subservient to the practical treatment of disease. Lord BACON has however noticed, that science rarely prospers when debased by lucrative pursuits. “It is no longer the *lumen siccum*, the pure light of truth, but it becometh the *lumen madidum*, or *maceratum*, being steeped in the humours of the affections.” But were the sentient principle, the

universal residence of pleasure and pain, with which all-pregnant Nature teems in every varied form of animal existence, to become an object of more general attention, the subject would doubtless be considered with more enlarged and liberal views.—Mankind would learn the wisdom of moderating their eager pursuit of sensual gratification, were they persuaded that the duration of every pleasurable emotion is in the inverse ratio of its intensity. If the general fact, that the presence of life and the susceptibility of pain are inseparably connected, were early impressed on the infant mind, fewer of the sports of youth would be derived from the sufferings of animal nature; and the voluntary infliction of unnecessary pain would be restrained by sympathy among persons of reflection, as it ought to be by law among the ignorant. Would it be indulging a too romantic notion, that if a sense of the delicate organization of the human frame, and the great evil of pain to a sentient being, were more habitually present to the mind, it might tend to diminish the frequency of national

war, that most strange anomaly in the character of civilized man ?

51. It is only by noting the phenomena exhibited by animated beings, and comparing them with each other, that we can expect to obtain any just knowledge of the laws of life. But from the steady contemplation of this subject, the attention, even of those devoted to the profession of medicine, has always been in some degree diverted by the fashionable studies of the time. The success attending the application of the principles of mechanical philosophy by NEWTON, to determine the laws of the planetary motions, led many persons to suppose that all the appearances of nature, and among them the animal functions, might be explained by the same means. The disciples of the Newtonian philosophy favoured the public with laborious calculations of the triturating powers of the human stomach, a membranous bag ; and the process of digestion was supposed to be illustrated by the analogous operation of

a pair of mill-stones in grinding corn. Then, there were mechanical theories of fever; muscular motion was supposed to be better understood by calling the bones levers, and the tendons cords; and the action of the heart, in circulating the blood, was likened to that of a forcing pump.

§2. Animal organization, in fact, exhibits the very reverse of what are commonly denominated the mechanical powers. Man has devised various contrivances to aid his personal strength in moving ponderous bodies, but such aid is in all cases obtained at the expence of time. In the living body, celerity of movement is the object to be attained, to which the expenditure of power appears to form no impediment. For this purpose the tendons of the muscles, or moving powers, are always attached to the shorter end of the lever, near to the centre of motion, and the living force exerted in action often exceeds a thousand-fold the resistance of the obstacle to be overcome. And such is the tenacity imparted by the principle of

animation, that less than a hundredth part of the force exerted by a living muscle is sufficient to destroy the cohesion of the same organ after death, and to tear its fibres asunder.*

53. By bringing various products of nature into novel points of contact, and subjecting them to the agency of heat, new combinations are formed; the pride of man is often gratified by discovery, and occasionally he appears to operate as a creative cause. For these reasons, chemistry has always been a favourite study with inquisitive minds, and chemists have been led to imagine, that the principles of their science might be successfully applied to explain the functions of the animal economy, and to illustrate the nature of their derangement by disease. That chemistry has improved the practice of medicine, by the introduction of many active and useful remedies, cannot be denied; but the more wise and prudent votaries of that science are the most cautious in applying its theories to the

illustration of the functions of organized beings endowed with the principle of life. Chemistry indeed occupies, in my opinion, too much of the attention of the student, according to the present plan of medical education ; as it diverts his mind from that steady attention to the laws of life, which constitute the proper and ultimate object of all his studies. A good chemist is rarely found to be a good practical physician.

54. The process of vegetation, that curious alchymy of nature by which mineral, excrementitious, and gaseous matters are transmuted into food for the support of animals, and fruits are imbued with that wonderful combination of fragrance and flavour which artificial cookery emulates in vain, bears indeed a more close analogy to the condition of animal existence. There is in vegetables a principle which imparts form, and resists decay. Plants live, and grow, and perpetuate their species, and are liable to various diseases, and to death, in like man-

ner as animals. The existenee of the vegetable kingdom of nature is neecessary for the support of the animal; and the physiology of plants and of animals in many instances, reflect mutual light on each other; and the cultivation of both these departments of the study of nature has frequently been combined with the happiest success.

55. To Man, placed as he is at the head of the creation, unto whom is given dominion over the whole of animated existenee, himself, to borrow the words of BACON, ‘ the final cause of all things ;’—‘ for,’ continues he, ‘ if man were removed from the world, creation would appear to be without a purpose,’ the nature and affections of sentient beings present objects of enquiry surely not less interesting than the arts of chemistry or mechanics. The laws of animal life, it is true, are only to be discovered by attentive and patient observation. The vital principle eludes the keenest researches of the anatomist, nor is its nature to be detected

by experiment. If man discovers an organ or which he does not perceive the utility, as nature does nothing in vain, he is under the necessity of confessing his ignorance. At every step in the investigation of the animal œconomy, the human mind is humbled by discovering the perfection of the works of God : An humiliation, however, sufficiently compensated by the pleasure of perceiving such evident marks of order and contrivance in every part of the animal frame. The exquisite adaptation of means to ends ; the constant and immediate perception of a purpose, or final cause of action, is certainly more conspicuous in the organization of the animal body, than in any other department of the study of nature, and irresistibly impresses the mind with a conviction of the existence of an intelligent Creator of all. ‘ Was the eye contrived without skill in opticks, or the ear without knowledge of sounds ?’*

56. ‘ So far from banishing the considerations

* NEWTON’S OPTICKS.

of final causes from our discussions, it would look more like philosophy, more like the love of true wisdom, and it would taste less of an idle curiosity, were we to multiply our researches in those departments of nature, where final causes are the chief objects of our attention.—The structure and economy of organized bodies in the animal and vegetable kingdoms. I cannot help remarking, with regret, that of late years, the taste of naturalists has greatly changed, and in my humble opinion for the worse. The study of inert matter has supplanted that of animal life. Chemistry and mineralogy are almost the sole objects of attention. Nay, the *ruins* of nature, the shattered relicks of a former world, seem a more engaging object than the numberless beauties that now adorn the present surface of our globe. I acknowledge that, even in these inanimate works, God has not left himself without a witness. Yet surely we do not in the bowels of the earth, nor even in the curious operations of chemical affinity, see so palpably, or so pleasantly, the incom-

prehensible wisdom and the providential beneficence of the Father of all, as in the animated objects.*

57. These speculations are not meant to terminate merely in the gratification of curiosity. The useful corollary intended to be drawn from an acquaintance with the functions of the animal economy is, a knowledge of the causes of their occasional derangement, as well as of the means of obviating them. Although the susceptibility of pain is a condition essential to the existence of sentient beings, [12] indeed useful to the support of life by warning them of the approach of danger, and indicating the necessity of fresh supplies of food, animals are

* This approbation of the studies which I wish to recommend, is copied verbatim from the *Elements of Mechanical Philosophy*, by JOHN ROBISON, LL.D. late Professor of Natural Philosophy in the University of Edinburgh, and is the more valuable as being the opinion of a man so deservedly eminent as a mathematical philosopher.

not intended to be constantly under the influence of disagreeable sensations. All the functions subservient to the support of life, are performed without our consciousness, and the perception of their operation is a proof of their being disordered. A certain share of corporeal well-being is not only requisite for the enjoyment of life, but is absolutely necessary to the proper discharge of its duties. An invalid is with difficulty pleased, and lives rather to suffer than to act. Many persons, and even whole communities, have renounced riches as being rather impediments to virtue than sources of real happiness ; but no man in his senses ever denied pain to be an evil, although he might think it a virtue to bear it with fortitude. ‘ As wisdom constitutes the happiness of the mind, so does the welfare of the body consist in **HEALTH**.*

58. The inferior classes of animals are directed to the proper means for supporting their

* **THALES**.

existence by instinct: a principle which appears to operate with the most unerring certainty in the insect tribe, and becomes gradually effaced in proportion as the organs of sense are multiplied, and faculties of a superior kind evolved. The rudiments of various animal instincts may indeed be traced in man living in a state of nature; but their energy is comparatively feeble, and, by the progress of civilization and refinement, they are nearly obliterated.

59. Man is born the most naked, imbecile, and helpless of animals. “*Nudum in nuda, natali die abjecerat natura, ad vagitus statim et ploratum, manibus pedibusque devinciendum, flens animal, ceteris imperaturum, cui scire nihil sine doctrina, non fari, non ingredi, non vesci, non aliud, naturæ sponte.*”* A child stands longer in need of parental care than the offspring of any other animal. But the multiplied wants of man are the means selected by Providence to develope and improve

* PLINY.

his faculty of reason. While peculiar classes of animals are confined to certain zones of the earth productive of their proper food ; man, in consequence of the means he has devised to modify temperature by appropriating for clothes the natural teguments of other animals, and by the management of fire, together with his powers of producing food, has rendered every soil and climate, from the equator almost to the pole, a fit habitation for himself.

60. Neither has man any natural food. The sentence incurred by his first disobedience has been fulfilled to the letter.---*In sudore vultus comedes panem tuum.* The earth spontaneously brings forth thorns and thistles, and by the sweat of his brow is man obliged to render it productive of his daily bread. The savage must ensnare by cunning, or subdue by force, the creature he devours as his prey ; and, like other carnivorous animals, he spreads solitude and devastation around the place of his abode. Agriculture and civilization are inseparably con-

needed, for no carnivorous animal is gregarious; and in the social state the quantity of labour required for the production of food is diminished by being divided. When man has learned the difficult art of rearing the peculiar classes of vegetables that furnish him with food, perpetual toil is still required to render the ground fit for their production, as well as to prevent the intrusion of useless or noxious kinds. Farinaceous matter constitutes the general basis of the food of man; and it is happily provided, that by the improvement of the instruments of labour, and the discovery of new sources of production, the quantity of it appears capable of being augmented to an extent of which the limits assuredly are not yet ascertained. In the occupation of producing food, man finds health and happiness, for it has been truly told him, ‘Thou *shalt* labour, and in so doing find peace, and produce plenty.’

61. Man is the only animal capable of deriving wisdom from the aggregate experience of his

species. The instinctive propensities of a child are far less correct than those of any other young animal; and, in order to unfold the faculty of reason, a certain portion of human life must be devoted to the purpose of education,—the proper object of which is to furnish the mind with the most useful knowledge, collected by preceding generations. Considering the variety of accidents to which the human body is exposed, the numberless sensual temptations, and artificial wants; accruing from living in society; the discovery and indiscriminate use of fermented and distilled liquors, which, to every animal but man, prove deadly poison;*—the adulteration of food;—and the sophistication of medicines, there seems to be hardly any subject concerning which man stands more in need of instruction, or at least precaution, than the care of his health. From mere ignorance of the animal economy, the constitution is often irreparably injured at an early period of life, without even the suspicion of improper conduct.

* Note K.

62. It has been observed, that the preservation of health is rather a virtue than an art ;—but even what virtue is, must be learned before it can be practised. *Abeant studia in mores.* For notwithstanding the seemingly delicate organization of the human frame, man possesses the power of resisting deleterious impressions, enduring extreme fatigue, and contending against the attacks of disease, in a degree far beyond any other created being. In the words of LORD BACON, ‘ this subject of man’s body is, of all other things in nature, most susceptible of remedy, but then that remedy is most susceptible of error. For the same subtilty of the subject doth cause large possibility and easy failing, and, therefore, the inquiry should be more exact.’

63. Attempts to instruct mankind how to manage themselves in sickness, must ever prove abortive. By disease the faculties of the mind are impaired as well as the functions of the body. Under the pressure of pain and anxiety, there

is in Man a propensity which may almost be termed instinctive, for it manifests itself also in animals, to expect relief from those who are supposed skilful, from whatever source their skill may be derived, in the nature and affections of the living body. In almost the rudest states of society, there are, accordingly, to be found certain persons professing to be acquainted with the art of curing diseases. The improvement of medicine has, in all countries, kept pace with that of the other departments of human knowledge; and, in ancient Greece, it partook of that perfection which every art and science attained among that extraordinary people. In polished and luxurious society the practice of medicine will always be a lucrative profession; and it is reasonable that the emoluments of those who honestly dedicate themselves to the discharge of its arduous and important duties, ought to augment in proportion as the value of individual life is enhanced by the security, as well as the variety, of its enjoyments.

Nor have the liberal-minded professors of the art generally evinced themselves undeserving the confidence reposed in them. The study of nature expands the mind; and no young men study their profession with more self-neglecting ardour than the votaries of medicine. The sanguine hopes which supported them through a laborious, and, in some respects, unpleasant course of study, are often, indeed, blasted by the chilling reception with which the result of all their pains is received by the world; where presumption, the offspring of ignorance, is often preferred to merit. There is not, indeed, any branch of human learning or philosophy, in which the professors of medicine have not excelled.*

64. It is proper to remark, that the popular treatment of disease has, at all times, emanated from the scientific. In proportion, therefore, as rational doctrines of medicine are diffused, will the domestic management of the sick be

* Note L.

improved. The admission of fresh and cool air to the chambers, and the application of clean linen to the persons of the sick,---more strict attention to cleanliness and ventilation,---the refreshing affusion of cold water, in certain species of fever, although now familiar processes, are all modern improvements, introduced with much difficulty by the more enlightened practitioners of medicine, in direct contradiction to prevalent habits and opinions. The dread of infection, so frequently a bar to the duties prescribed by charity, and by love, has also been greatly diminished, in consequence of the nature and limits of contagion being better ascertained. Much, however, yet remains to be done, especially in impressing the minds of persons labouring under chronic diseases, with a due sense of the importance of submitting to a proper regulation of regimen, which is often a matter of no less importance than even the administration of medicine. Aware of this circumstance, Dr. GREGORY justly observes, —“ Physicians do not concern themselves with

matters of this kind, nor with the regimen of mankind, unless their advice is particularly asked. These matters are founded on established customs and prejudices, which it is difficult to conquer, and dangerous to attack; nor will it ever be attempted by men, who depend on the favour and caprice of the world for their subsistence, and who find it their interest rather to flatter prejudice than to oppose it.”*

65. By the ancients, medicine was cultivated as a branch of philosophy, which professed not only to alleviate present pain, but also to teach the means of protracting the existence of a sound mind in a sound body.† GALEN asserted, that by appropriate regimen he could effect a total change in the physical temperament of the body,

* A comparative view of the Faculties of Man, with those of the animal world; by J.GREGORY, M.D.

† *Primoque medendi scientia, pars sapientiæ habebatur.*—CELSUS.

and even alter and improve the disposition of the mind ;—and the celebrated ASCLEPEIADES solemnly engaged to renounce all claim to the title of physician, should he ever become the victim of disease ; and, what is more extraordinary, he lived to redeem his pledge ; for, after having attained the age of a hundred years, he died in consequence of a fall. A death which, though accidental, could hardly be termed premature.*

66. Among the nations of antiquity, success in war depended no less on bodily strength than upon courage ; when engaged in actual combat, superior personal energy conferred important advantages on those who were possessed of it. To render youth robust, and to call forth the full energies of the active organs, were, therefore, objects of public attention in every well-regulated community. The honours conferred upon those individuals who excelled in feats of active strength, at the public festivals, instituted for the express purpose of rewarding

merit, afford convincing proofs that corporeal excellence was not then less an object of esteem than intellectual superiority. These gymnastic exercises were always conducted under the superintendence of persons versed in the medical art, and they were calculated to develop every excellence of the human frame. To their effects we doubtless owe those exquisite representations of the human form sculptured in marble, which seem almost to breathe, and which modern artists must ever be precluded from hoping to equal, by the comparative tameness and imperfection of the models which they have to imitate. From the accounts remaining of the domestic habits of the learned men of antiquity, we know that those even most devoted to literary occupations, never neglected to dedicate a portion of the day to exercise, the bath, and other means conducive to the maintenance of health. That these habits were of essential utility in training men to sustain, with impunity, the hardships of real war, is proved by the curious fact, that we possess no account of

any warlike enterprise in ancient times, being defeated by the sickness of the troops engaged in it; while, in modern warfare, many more men perish by disease than by the sword. And the average duration of the lives of the philosophers of antiquity, instead of being proverbially short, like those of modern literary men, appears to have considerably exceeded the common term allotted to mankind in general.*

67. The introduction of fire arms has rendered corporeal vigour an element of less value in the art of war. To rear a vigorous race of men has ceased to be an object of public importance. The necessity of sedentary habits, for the acquisition of languages, at present considered as the chief object of education, has led to the discouragement and neglect of athletic exercises, so natural, and so necessary to the welfare of youth. Persons occupied in laborious employments, whether within or without doors,

* Note N.

are induced, by the expectation of high wages, which are again expended in useless, if not noxious luxuries, to make exertions beyond their natural powers, by which premature old age, and untimely death, is incurred. Upon the whole, it may be observed, that the minds, as well as the bodies of the moderns are more burthened, and less exercised than those of the ancients. It may be worth while to inquire whether the condition of mankind has been improved by this general system of over-labour; and whether the possession of good health, and natural length of days, be circumstances in reality incompatible with a high state of civilization.

68. The means of preserving health are evidently of two kinds, public and private. In divers parts of Europe professorships of *hygiène*, or the art of preserving public and private health, are found to exist. The purpose of such establishments is to teach prophylactic medicine, or the art of preventing disease; and to watch over the public health, by guarding against the

introduction of injurious, although, perhaps, unsuspected articles of the first importance to human existence, and to point out to those who are entering upon the career of life, the consequences of contracting improper habits; and inculcating the virtue of self-command, which is both a cause and a consequence of vigorous health. In this country the public health engages no share of the attention of the legislature, which appears more desirous of profiting by the vices, than of correcting the errors of the people. Deleterious articles of diet are vended with impunity; and secret, and for that very reason dangerous nostrums obtain even the apparent sanction of government, provided the public revenue is augmented by their sale. My province must, of necessity therefore, be limited to pointing out the means of preserving health, and of avoiding disease, as far as they depend on individual attention.

69. Few people, indeed, think of paying any regard to their health till they are assailed by

disease, when they must necessarily commit the cure of their complaints to some professional man, who, naturally most attentive to what he finds most profitable, although he may remove the present evil, has no real interest in the future and permanent welfare of his patient. But, were the means of preserving health the most certain, and the best understood of any of the departments of the science of medicine, regarded as the ultimate object of attention, those sordid motives, which have in modern times degraded medicine to the condition of a lucrative trade, might be with truth disclaimed, and we might hope to see the expectation and desire expressed by LORD BACON realized, "Then," says he, "might the more respectable class of physicians exalt their views, and no longer wholly occupied *sordibus curarum*, in the sordid trade of curing diseases, nor honored but for necessity, they might be considered as the ministers of divine omnipotence and clemency, occupied in renovating and prolonging the life of man, especially as these desirable objects may

be effected by means safe, easy, and practicable, although hitherto untried.”*

70. Writers on the subject of medicine may be divided into two classes,—Those who have detailed with fidelity the events which they had actually observed to take place,—and those who having formed certain opinions, or hypothesis, concerning the functions of the animal economy, supposed that by such means they could account for the nature and phenomena of disease. The notion of being able to detect and control the workings of nature flatters human vanity; hence the infinite variety of medical theories, and pretensions to cure diseases, by cutting short their duration. But the means by which nature works, the *opus quod operatur* DEUS *a principio usque ad finem*, is probably not intended to be discovered by man, although a spirit of restless and ill-directed curiosity prompts him to be perpe-

* Preface to the History of Life and Death.

tually in quest of it. Forgetful that the proper and legitimate object of his employment in the contemplation of the works of God is so accurately pointed out, and defined by BACON, in his first aphorism *De interpretatione Naturæ*. "*Homo, naturæ minister et interpres, tantum facit et intelligit, quantum de naturæ ordine, re vel mente observaverit, nec amplius scit, aut potest,*"

71. Every physician who has been a genuine observer of nature, from HIPPOCRATES to HEBERDEN, has acknowledged that there exists in the living body a power of correcting occasional derangements, a modification of the conservative principle of life, tending to restore health when impaired by accident, and to repair the continuity of the living solid, when it has been divided by violence.* But for the operation of some such energy no wound would unite, and all diseases must prove mortal. A con-

* Note O.

viction that injuries arising from external causes are healed by the inherent energies of the living body, and, that art is best employed in removing the impediments to those sanative efforts, constitutes the basis of all the modern improvements in practical surgery. But the same opinion does not prevail respecting the means of curing those more general affections of the constitution, the management of which is considered as the proper province of the physician. This diversity of opinion respecting the treatment of external and internal diseases, may, in part, depend on the injurious consequences produced by medicines received into the stomach not being quite so obvious as the mischiefs attendant on the improper use of topical remedies ; and partly on that unfounded confidence of the sick in the efficacy of drugs, arising from the interested misrepresentations of those who profit by the administration of them. The conceit that the works of nature cannot go on without the interference of man borders almost on impiety. Is it credible, for example, that a

human infant should be so imperfectly organized, that it cannot pass over the years of childhood, naturally the most healthy period of life, except the biliary system be ever and anon expurgated by calomel? or that the early and habitual use of this mineral poison can be unattended with injurious consequences? Perhaps the time may come when the most judicious plan of curing internal, as well as external complaints, will be acknowledged to consist in removing all impediments to the natural exertions made by the vital energy to restore health. *Natura parendo vincitur.*

72. Man stands pre-eminently distinguished above the rest of the animal creation; nor is a greater liability to disease among the least of his prerogatives.* The catalogue of human miseries, exhibited in a modern system of nosology, is indeed sufficient to appal the stoutest heart, whether contemplated with a view to suffering, or to curing them. Diseases, in general, are divided

* Note P.

into acute and chronic. Acute diseases are said to be derived from God,* and active remedies are required for removing them. But when it is considered that all drugs, improperly administered, prove poisons, [though, unfortunately for the good of mankind, the converse of the proposition is not equally true, for all poisons are not remedies,] and that the preparation of these instruments of cure can hardly be depended on from the hands to which that process must necessarily be committed, a conscientious man need not be ashamed of acknowledging some feelings of compunction, under the serious responsibility of tampering with human life by means, with the nature of which he is necessarily so imperfectly acquainted.

73. Chronic complaints, originating from external and manifest causes, are less rapid in their course, and less dangerous in their issue,

* *Morbi acuti ut plurimum Deum habent auctorem, sicut chronici ipsos nos.*——SYDENHAM.

than the acute. It is, indeed, reasonable to suppose, that diseases induced by misconduct, may admit of being alleviated, or removed by a prudent alteration in the evil customs from which they derived their origin.* We are informed, that ‘ *God created man upright, but they have sought out many inventions.*’ Let it, then, be our endeavour to try whether it be not possible to discriminate, and, of course, to eschew such of these inventions as are the sources of disease, and have a tendency to shorten the duration of human existence. So occupied, a man might be considered as a minister of life, humbly attempting to recover some portion of the fruit of that tree, the taste of which, let it be remembered, was not like that of the tree of knowledge, interdicted to our first parents. For ‘ *God created*

* In plerisque morbis optabilius est, ut extrinsecus, quam intus nascentur. HEBERDEN, Hist. Morborum.

*man to be immortal, and made him an image of his own eternity.”**

74. In consequence of possessing a temperament readily disordered by every slight irregularity, but which possesses the power also of quickly rectifying itself by due attention to external circumstances, my mind was early impressed with a sense of the utility and importance of the prophylactick department of medicine, or the means of preserving health. Perceiving that, in modern times, this subject had fallen into comparative neglect, although cultivated with great assiduity by the ancients, I have much occupied myself in collecting and perusing whatever has been written concerning human health. The authors by whom this matter has been treated, may be arranged in two classes.—Those who pretended that health might be preserved, and life prolonged, by certain chemical compounds which they called Elixirs, pretensions which,

* WISDOM. Note Q.

as they were founded in fraud, uniformly terminated in disappointment; *—and those who rested their hopes of preserving bodily health, on strict attention to regimen of diet and exercise, respecting the effects of which, I can with truth assert, my own life has been a long experiment. Without going quite so far as the ancient Therapeutæ, whose confidence in their peculiar regimen to maintain health was such that, if attacked by disease, many of them preferred a voluntary death to the opprobrium of being sick; it may be averred that the general welfare of human life, depends as much on the due application, as on the extent of the means by which it is supported; and the generality of those writers, who, influenced by warmth of imagination, or benevolence of temper, have indulged in speculations concerning the possible melioration of the condition of the human species, have acknowledged that the moral conduct of man is considerably influenced by his physical habits

* Note R.

of existence.* I trust I am not insensible of the difficulties attendant on any attempt to explain the laws by which the manifold actions of living beings are regulated, or to give rules for obviating or reetifying their occasional disorders; although I cannot acquiesce in the opinion of a late highly respectable physician, that we must not hope to make any further progress in comprehending the laws of life, until some man shall arise, who, contemplating animated beings, in like manner as NEWTON did inert matter, shall detect that principle of life by which all their actions are maintained and regulated.† Now, although NEWTON certainly discovered that all the particles of matter reciprocally gravitate towards each other, and successfully applied the results of that sublime

* ISAIAH, cap. lxxv. MORE'S UTOPIA. DESCARTES. BERKLEY. CONDORCET. MACLAURIN, &c.

† Vide commentarios de morborum historia; GUL. HEBBERDEN, prope finem.

discovery to explain the motions of the planetary system, he expressly disclaimed any knowledge of the essential nature of the principle of gravity.* If I succeed in awakening the attention of any portion of the public to the importance of what I shall venture to denominate the Philosophy of Life, my purpose will be fulfilled, and I shall relinquish all pretensions to the discovery of the nature of the principle of vitality [should the possibility of such discovery be, indeed, within the scope of the intellectual faculties of man] to some future genius, whose attentions may haply be attracted to the subject by the present humble attempt.

75. Among what Lord BACON terms *Magnalia naturæ, præcipue quoad usus humanos*, he has enumerated the prolongation of life; the restitution of youth, in some degree; the retardation of age; the curing diseases counted in-

* See his Letters to BENTLEY.

curable; the mitigation of pain; the increase of strength and activity; the increasing of ability to suffer pain, &c. The possibility of effecting any of these purposes, may be questioned; but the statement of them proves that by him they were considered as matters worthy of farther investigation. We know that by means of the athletic regimen, or *training*, as it is technically termed, bodily strength and activity, as well as the ability to endure pain, may be considerably augmented.* The perpetual youth of nature being supported by the successive reproduction of the various classes of animals and vegetables which cover the face of the earth, the existence of individuals must necessarily have an end. To die, is as natural as to be born. Death is, indeed, the tenure by which life is held, but to animated beings are given very different terms of endurance. Duration of life is of peculiar importance to human beings, on account

* A detailed account of the modern plan of training men, and other animals, to perform exertions of strength and activity, may be found in Sir JOHN SINCLAIR'S CODE OF HEALTH.

of the slow developement of their rational faculties; although the fear of death, which is peculiar to man, is apparently the principal ground of his wish for longevity. Compared with that of other animals, the life of man is long. The diminution of strength in the carnivorous, and the decay of their teeth in the gramivorous classes, form insuperable obstacles to the prolongation of their existence, much beyond the term when they have attained to the perfection of their kind. But man, by living in society, is enabled to overcome these impediments, and to social man, life, therefore, continues to be of value, as long as the faculties of his mind remain unimpaired.* ‘Life may be lengthened by care, though death cannot be ultimately deflected.’†

76. Although it may be impossible for man to prolong his days beyond their appointed period, we have it from the best authority that it is in his power to shorten their duration.

* Note S.

† SAM. JOHNSON:

“ Be not overmuch wicked ; neither be thou foolish ; why shouldst thou die before thy time ? ”

The various conditions of human life have, assuredly, very different effects on the extent of it. What a contrast between the pent-up artisan,—who, while he plies the sickly trade, becomes pale, and droops, and dies a premature death, like an etiolated plant, for want of light and air ;—and the Arab of the desert, according to all accounts, the most healthy, and active, and independent of human beings ; whose whole existence is passed in the open air, and whose perfect temperance exempts him from all disease, even from being attacked by the plague.* No man doubts that life may be shortened by intemperance, or by fatigue, carried to extremes. Surely then, it may be worth the while of those ‘ that have prosperity in all things,’ that can make life desirable, to inquire, guided by the lights of observation and experience, whether any rational means do exist of attaining that

* Assalini, and Jackson.

wisdom which bestoweth length of days, and which must be considered as a blessing, being repeatedly promised in the sacred scriptures as a reward to those who keep the commandments of God. “ For though, as christians, we aspire and labour to come to the land of promise, yet it may be considered as a token of divine favour, if our shoes, and the garments of our frail body, be but little worn during our pilgrimage through this world’s wilderness.”*

77. If any farther apology be requisite for attempting to draw the attention of some portion of mankind, in this age of general inquiry, to objects of such acknowledged importance as life, health, and the means of preserving it, I may cite the example of that great and wise man who has already been so often quoted, because I consider his authority as paramount in all matters pertaining to natural philosophy, of which, in this country, he is justly deemed the

* BACON,—and Note S.

Father. In the preface to his history of Life and Death, which is, in fact, a treatise on the preservation of health, LORD BACON states that, ‘ although this was originally the last in order of six monthly designations, which he intended to publish, he thought it good to change his plan, and to give it the second place ; because even the smallest loss of time is precious in a matter of such great utility, and which he hopes and trusts may redound to the good of many.’ Nor is it in my power to convey a notion of the general nature and import of the matters intended to be treated of in these lectures more clearly than in the very words of the same eminent philosopher. In the second book of the *Advancement of Learning*, he observes ;—‘ The knowledge that concerneth man’s body is divided as the good of man’s body is divided, unto which it referreth. The good of man’s body is of four kinds ; Health, Beauty, Strength, and Pleasure ; so the knowledges are, medicine or art of cure ;

art of decoration, which is called cosmetic ;*
 art of activity, which is called athletic ; and art
 voluptuary, which TACITUS truly calleth
Eruditus luxus. It is evidently true that, of all sub-
 stances which nature hath produced, man's body
 is the most extremely compounded. For we see
 herbs and plants are nourished by earth and
 water ; beasts for the most part by herbs and
 fruits ; man by the flesh of beasts, birds, fishes,
 herbs, grains, fruits, water, and the manifold
 alterations, dressings, and preparations of these
 several bodies, before they come to be his food
 and aliment. Add hereunto that beasts have a
 more simple order of life, and less change of
 affections to work upon their bodies ; whereas
 man in his mansion, sleep, exercise, passions,
 hath infinite variations ; and it cannot be denied
 but that the body of man is of all other things
 the most compounded mass. The soul, on the

* Real beauty is intimately connected with health. And, as it has been justly said, that hypocrisy is the tribute paid by vice to virtue ; so the tricks of artificial beauty originate in the conscious acknowledgment of the superior charms of health.

other side, is the simplest of substances, as is well expressed.

‘Purumque reliquit

Æthereum sensum, atque aurai simplicis ignem.’

This variable composition of man’s body, hath made it an instrument easy to distemper; and, therefore, the poets did well to conjoin music and medicine in APOLLO, because the office of medicine is but to tune this curious harp of man’s body, and to reduce it to harmony.’ Considering the state of natural knowledge, at the period when LORD BACON’S history of Life and Death was written, it will be found to contain a prodigious accumulation of important facts, mingled, unquestionably, with some false reasoning. The limits of the different kingdoms of nature not having at that time been clearly ascertained, unfounded conclusions are occasionally deduced from the affections of inert matter, and misapplied to the state and condition of animated beings.—May I be permitted to indulge a hope that the present attempt to bring some of the rays of that light

which has been diffused by the more recent improvements in natural philosophy, to bear upon the subject of sentient existence, will be considered, as in some measure conducing to fulfil one purpose of this great man; not only by teaching how to maintain the harmonious play of this living harp, but also to promote the usefulness and respectability of a science,—‘ which that its professors should do, the nobleness of their art doth deserve, well shadowed by the poets, in that they made *ÆSCULAPIUS* the son of the Sun, the one being the fountain of light, and the other the second stream : but infinitely more honoured by the example of our SAVIOUR, who made the body of man the object of his miracles, as the soul was the object of his doctrine.’*

* BACON.

NOTES.

Note A.---Page 3.

I AM aware that philosophers of high and deserved reputation are of opinion that we have no better grounds for deriving the notion of power from life, or the *animal nisus*, than from the mutual operation of inert matter ; because we only perceive muscular action to be the consequence of volition, but are ignorant of the intermediate means by which the exertion is effected. I shall not controvert this metaphysical position, because I am not sure that I understand it. But that mankind, in general, have derived their notions of power from observing the

exertions of living animals is, I think, proved by the radical structure of language, that best index to the operations of the mind. What constitutes the difference between the noun and the verb,—the simple name of an object, and the expression denoting it to be in a state of action? Merely the addition of the particle, significant of a living being, which instantly personifies, or confers life upon it, converting the *noun* into a *verb*; e. g. *am.* mother, *am-ego*, *am-o* mother I, I have the feelings of a mother, *I love*. A sentence without a verb is said to be destitute of meaning; it is a collection of appellatives upon which the verb confers sense, calls them into life and action, by indicating their mutual relations and operations. In the most copious and correct of tongues, we find the terms significative of life and power, $\beta\iota\alpha$ and $\beta\iota\omicron\varsigma$, so analogous in sound and sense, that it is hardly possible to imagine they do not spring from the same radical notion. The terms $\beta\iota\eta$ is used to convey a mingled idea of power and exertion, as $\beta\iota\eta$ $\text{H}\epsilon\varsigma\alpha\chi\lambda\epsilon\iota\eta$, the living majesty and power of Hercules. The intermixture of the inflexions of the substantive verb $\epsilon\mu\iota$, and the verb signifying simple motion $\epsilon\omega$, affords a proof that the ideas of life and activity are intimately connected in the human mind.

The term *μενος* signifying energy, power, wrath ; *mens*, the mind ; *manus*, the hand, the instrument exerting power ; *manes*, departed spirits or minds ; *inneo*, I put in mind ; *maneo*, I remain, exist, may all be traced to the sanscrit *mana* or *manu*, the appellation of the first created human creature, the original of the gothic *mann* ; Man, the being in whom active energy is pre-eminently conspicuous.

This propensity to suppose the presence of life wherever motion is perceived, anciently peopled the woods and wilds with the sylvan Deities, and poured the rivers from their urns. In latter times, it has given birth to the tribe of elves and fairies, and is the origin of the popular belief in ghosts and witches. The personifications of poetry are founded on the same principle, and the facility with which the mind acquiesces in their existence, shews that it is congenial to human nature. Even diseases have been personified ; formerly they were supposed to be evil spirits which might be expelled from the body by appropriate exorcisms. At present some obscure notions seem to prevail that there is analogy between diseases and vegetables, as it is common to talk of eradicating

diseases ; but if they possess roots, why not branches and leaves? It is the business of philosophy to guard against this metaphorical language, the employment of which is the source of much error in every department of science.

Note B.---Page 5.

This definition of life nearly corresponds with that given by CICERO. *Inanimatum est omne quod pulsu agitur externo : quod autem animal est, id motu cietur interiore et suo ; nam hæc est natura propria animi atque vis.*

The same Author observes, that an acquaintance with the structure and organization of the human body, is peculiarly well calculated to prove the existence of the ‘ Deity. *Facilius intelligetur a diis immortalibus hominibus esse provisum,*’ si erit tota hominis fabricatio perspecta, omnisque humanæ naturæ figura atque perfectio.

The celebrated HÄÜY has noticed that the structure and shape of all minerals is terminated by straight lines and angles ; whereas, the organized forms of

vegetables and animals are circumscribed by undulating outlines, composed of portions of curvilinear figures. Can this fact have any relation to the waving line which has been supposed to constitute the principle of beauty? —an epithet applied with more propriety to the animal and vegetable, than to the mineral kingdom of nature.

Note C.---Page 6.

‘What constitutes an *individual*, and makes a person what he is in opposition to others, is *the principle of life*; the body and its properties being in constant fluctuation, and, as it were, common to all. Hence, in most languages the word which signifies *life*, signifies also *self*. Thus *sul-us* in Latin, *sawl* in Celtic, and *soul* in English, are of the same oriental origin, and still used in nearly the same sense. In Hebrew, *nuphesh*, which signifies *soul*, or *life*, is often used to signify what we call *self*: and the Arabs have borrowed the term in the same signification.—The Greeks affix to $\psi\chi\eta$ a similar meaning. Homer says of Nestor, that he encountered many hardships

in saving *his own soul*, (i. e. himself) and the return of his associates.

Αγρυσαμενος ἦν τε ψυχὴν καὶ νοσον ἐταίρων.

In the same sense it is used by the Apostle Paul, when he says that the divine anger is *upon every soul of man*. Rom. ii. 9. ἐπὶ πᾶσαν ψυχὴν αἰθεῖται that doth evil. i. e. upon every individual man ; insinuating that the judgment of God will be conducted against men not *collectively*, and, as it were, in a loose general way, but individually, and with the utmost precision.' Vide the excellent Greek grammar, by Mr. J. Jones.

The ancients, observing the temporary nature of individual existence, denominated the universe, the place of forms, the harmony of which they conceived to be maintained by the reciprocal operation of the powers of creation and destruction, which were sometimes typified by a bull and a lion, supporting between them a lyre ; and Apollo was worshipped under the double character of the destroyer and creator.

Note D.---Page 10.

The effects of castration demonstrate that the natural weapons of male animals are bestowed on them for the purpose of enabling them to contend for the female, of whom the most powerful obtains the possession. If an animal be deprived of the glands which secrete the seminal fluid at an early period of life, these instruments of hostility never make their appearance. By this operation, the cock is deprived of his spurs, and the buck of his antlers, and he ever afterwards shuns the combat, and even avoids association with his unmutated fellows. The distinguishing characteristics of the masculine sex are by this means obliterated. The short, firm, pointed horn of the bull becomes elongated and pendent in the ox ; and the tremendous bellow of the former is lost in the lowing of the cow. The torosity of the muscles disappears, and a propensity to accumulate fat is acquired, by which the nutritious and succulent qualities of their flesh as food are augmented. By a similar operation the changes that ought to take place at the age of puberty, in the human species, are

prevented, and the effects produced upon the voice are well known. ‘ Quicunque vero eunuchi, dum pueri sunt, fiunt, propterea neque in pube, neque in mento, pilas producunt, lævesque toti existunt.’
HIPPOCRATES *de Natura Pueri*.

Cervum admodum juvenem castrari jussi : qui exinde nulla unquam cornua habebat. Vide, *ÆCONOMIA NATURÆ*, R. RUSSEL, M. D.

Note E.---Page 12.

Is not ratiocination merely the act of the mind employed in *com-paring* our present perceptions with each other, or with the ideas of those that are past? The latter process appears to constitute voluntary memory, a faculty peculiar to man. The process of reasoning is generally described in language derived from the operations of the instruments devised by mankind to assist their senses in ascertaining the relations of material bodies.

To ascertain the dimensions in length, or breadth, or thickness of any portion of matter, a measure, or

ratio, is used. And a *syllogism* is a *placing together* of words or phrases, with a view to *com-pare* them, and to discover in what respects they agree and differ, and to find a middle term, or proportion, by which the *ratio* of their difference may be estimated.

The undeviating nature of gravitation renders the balance an instrument of very extensive utility in determining the relative weight of bodies, and a variety of phrases, expressive of mental operations, are derived from the different affections of the simple lever, used for the purpose of comparing weights. When in doubt, the mind is said to deliberate, to ponder, to weigh, to balance. If attention be paid to the vibrations of the index, in Latin *examen*, we are said to examine. Judge, and perhaps *jus*, may come from *jugum*, the yoke or beam of the balance. The name of the sign *libra*, or the balance, is *jugum*. The term truth, may, perhaps, be derived from the Roman *trutina*, as that is from $\tau\epsilon\upsilon\varsigma$, or $\tau\epsilon\theta\varsigma$, the perforation in which the axis of the scale-beam rests or rubs, and upon the correct position and formation of which the *truth*, and consequent utility of the instrument essentially depends.

By the discovery of numeration or arithmetic, man has obtained a *nomos* or rule, by means of which he can compare the relations of magnitude, weight, and motion, with wonderful accuracy: and, as ‘all things were ordered in measure, number, and weight,’ he is enabled to judge of the universal frame of things, by the same principles according to which they were formed, and the employment of these faculties constitutes reason, by which he is distinguished from all created beings.

Note F.---Page 15.

MILTON considers self-knowledge as an attribute peculiar to man, and derived from the faculty of reason.

‘ There wanted yet, a creature who not prone
And brute as other creatures, but endued
With sanctity of reason, might erect
His stature, and upright with front serene
Govern the rest, SELF-KNOWING, and from thence
Magnanimous to correspond with heaven,

But grateful to acknowledge whence his good
 Descends, thither with heart and voice, and eyes,
 Directed in devotion, to adore
 And worship God supreme, who made him chief
 Of all his works.'

The Pythagorean philosophers made self-knowledge a science of great extent, comprehending the knowledge of the whole works of nature.

PYTHAGORAS primus omnium cœlum appellavit *Mundum* : quia perfectum est, omnibusque animantium signis, et nullo non pulchritudinis genere exornatum.—Homo microcosmus, sive mundi compendium, dicitur, non quod ex quatuor elementis constet, verum quia omnes mundi virtutes continet.—Ideoque præceptum illud, NOSCE TEIPSUM, quamvis facillimum videatur, omnium nihilominus difficillimum est : Monet autem nos, ut quisque vim virtutemque suam cognoscat. Sed nosse seipsum nihil aliud est quam totius mundi naturam nosse. Quod fieri non potest, nisi philosophiæ operam demus : quod Deus hoc præcepto nos admonet.

ANONYMUS apud *Photium*, de vita Pythagoræ.

LINNÆUS also considers self-knowledge as the peculiar characteristic of man.

HOMO. *nosce teipsum.*

NOSCE TEIPSUM, gradus est primus sapientiæ, dictumque SOLONIS, quondam scriptum literis aureis supra DIANÆ templum. It may be understood in various senses.

1. PHYSIOLOGICALLY. That we are made up of nerves and fibres, endowed with various faculties, and superior to all other animals.—Ergo, *Tecum habita.*

2. DIETETICALLY. Health and peace constitute happiness, which is maintained by moderation, and destroyed by excess. Nature is satisfied with little, Man labours for superfluities. *Cura valetudinem.*

3. PATHOLOGICALLY. Life is a bubble, suspended by a hair. *Memento mori.*

4. NATURALLY. Life is passed in vanity and

repentance. We neglect the present, and live in hopes of a futurity, which may never arrive. *Innocue vivito : Numen adest.*

5. POLITICALLY. Do not trifle life away, till the approach of death discovers your dream,—*sic vivimus ut immortales, et morimur ut mortales.* SENECA. *Esto antiqua virtute et fide.*

6. MORALLY. Live a moral life, influenced by the mind rather than the body. *Benefac et latare.*

7. THEOLOGICALLY. Remember thou art the end of creation, introduced into the world to contemplate and admire the works of God, and to glorify their maker. *Homo solus Deum contemplator : Memento Creatoris tui.*

Note G.---Page 16.

The laws of motion, deduced from the essential properties of matter are completely at variance with the phenomena exhibited by animated beings.

1. LAW. ‘ Every body remains at rest, or in uniform motion, till compelled to change its state by some external force.’

But living beings move spontaneously, or from an inherent active principle, with varying degrees of swiftness, and in different directions, independently of external impulse.

2. LAW. 'Every motion, or change of motion, in matter, is in proportion to, and in the direction of the force impressed.'

The actions of animals are excited by pain or pleasure ; and these motives operate, not in the ratio of their proper intensity, but according to the nature and susceptibility of the animal to which they are applied. A certain degree of stimulation will cause a blood-horse to exert all his energy in running, beyond which no increase of pain can augment his speed ; nor will any degree of pain enable a cart-horse to move with equal velocity.

3. LAW. 'Action and re-action are equal.'

The spontaneous actions of animals are directed by volition, and the involuntary are attributed to irritability ; but between the operation of a stimulus, or a

motive, and the re-action of the living system, there exists no commensurable ratio.

Note H.---Page 23.

The wonderful cures performed by VALENTINE GREATTRACKS, the *stroker*, about the year 1666, in white swellings, scrofulous tumours, and dead palsies of many years standing, are witnessed by contemporary Prelates, such as Bishop Wilkins, members of Parliament, and of the royal society, among whom was Mr. BOYLE, and many respectable clergymen. He was an Irish gentleman of good family, and in the very candid account he published of himself and his calling, he appears quite unconscious of any purpose to deceive. He applied his hands to the diseased, and they were healed ; but he disclaims all knowledge of the means by which these effects were produced. He appears to have been persecuted, and finally suppressed, by the medical practitioners of the day. Diseases are certainly much influenced by the state of the mind. I have seen a patient, who had required the support of crutches for many months, in consequence

of defective use of the lower extremities, recover within twenty-four hours after having arrived at the sea-coast, to whom it presented an entire novel combination of objects. In many cases, it is well known, that recovery from disease is promoted by confidence in the Physician. Faith certainly does perform cures. See a brief account of Mr. VALENTINE GREATTRACK'S strange cures, by him lately performed.

The cures effected by the *royal touch*, appear to have rested on different principles. From the writings of the celebrated WISEMAN, and the ADENOCHOIRADELOGIA, or treatise on *the royal gift of healing*, by JOHN BROWNE, it appears that part of the duty of the Serjeant Surgeon and royal Physicians, formerly was to select such patients afflicted with scrofula, as evinced some tendency towards recovery, and they took especial care to choose those who approached the age of puberty, a period when the natural energies of the constitution, in their attempt to bring it to perfection, will occasionally subdue the tendency to scrofulous diathesis. This book contains a detailed account of the ceremony, illustrated by an engraving, which seems to have been conducted with much solemnity.

The number of persons touched, and presented with tokens of gold or silver, by his Majesty King CHARLES II. in one year exceeded 4,000. His Majesty's successors apparently need not regret their having ceased to exercise this branch of the royal prerogative.

To the effects of the *Sympathetic Powder*, blazoned by Sir KENELM DIGBY, unquestionably among the first Philosophers of his time, Surgeons are in my opinion, indebted for one of the chief improvements of their art, healing wounds, by what is technically termed the first intention. The powder was applied to the weapon, by which the wound had been inflicted, covered with salve, and regularly dressed two or three times a day. The wound, meantime, was directed to be brought together, and carefully bound up with clean linen rags, and *let alone* for seven days. At the end of that period the bandages were removed, and to the glory of Sir KENELM, and the astonishment of the Surgeons and by-standers, the wound was in a great majority of instances found perfectly united; and the cure was with due-solemnity attributed to the powder and plasters which had, *secundum artem*, been daily applied to the innocent sword or dagger.

Vide. Of *the sympathetic powder* ; a discourse in a solemn assembly at Montpellier. By Sir KENELM DIGBY, Knight. 1657.

Note I.---Page 36.

The ancients entertained some vague opinions, that animal motion was the consequence of a complication of wheels and levers, actuated by the spirits ; forgetful that machinery does not produce action, but on the contrary, that every machine is more difficult to be moved in proportion to the variety of parts that enter into its composition. LUCRETIVS thinks he explains animal motion when he tells us,

*Multaque per trochleas, et tympana pondere magno,
Commovet, atque levi subtollet machina nisu.'*

BORRELLUS was the first who demonstrated that the force exerted within the body greatly exceeds the weight to be moved without, and that nature in fact employs an immense power to move a small weight. 'Demonstrabo enim vere machinas in motionibus animalis adhiberi, et illas multiplices et varias esse ; attamen non parva virtute magna pondera sublevari, sed è con-

tra magna virtute et robore facultatis animalis parva pondera sustineri, ita ut multoties virtus motiva centies et millies superet pondus ossium et articularum sublevatorum, et nunquam minor sit illis, et hocerit præcipuum hujus primæ partis subjectum et materia.*

It has been calculated that the deltoid muscle alone, when employed in supporting a weight of 50 pounds, exerts a force equal to 2568 pounds. Some notion of the force exerted by the human body in progressive motion, may be formed, from the violence of the shock received, when the foot unexpectedly impinges against any obstacle in running. The strongest bones are occasionally fractured by the action of the muscles. The muscular power of the human body is indeed wonderful. A Turkish porter, will run along carrying a weight of 600 pound. And MILO, of Crotona, is said to have lifted an ox weighing upwards of a 1000 pound. HALLER mentions that he saw an instance of a man, whose finger being caught in a chain at the bottom of a mine, by keeping it forcibly bent, supported by that means the weight of his whole body, 150 pounds, till he was drawn up to the surface, a distance of 600 feet. AUGUSTUS II. King

* DE MOTU ANIMALIUM, 1743.

of Poland, could, with his fingers, roll up a silver dish like a sheet of paper, and twist the strongest horse-shoe asunder. And a Lion, is said (Phil. Trans. N. 310) to have left the impressions of his teeth upon a piece of solid iron. The most prodigious power of the muscles is exhibited by fish. A whale moves with a velocity through the dense medium of water, that would carry him, if continued at the same rate, round the world in little more than a fortnight ; and a sword-fish, has been known to strike his weapon quite through the oak plank of a ship.

The action of a muscle, differs from all other kinds of motion, in being excited by a stimulus. This property is termed irritability, of the nature of which we are equally ignorant, as we are of the source of every other kind of motion. We only know that it is essentially connected with the presence of the vital principle, and has therefore been denominated the attraction of life.

Respecting the muscles, the bones constitute levers of the third order, where the moving power acts between the fulcrum and the weight, as when a man rears a ladder, that is, in the most disadvantageous

manner to the power applied, but most favourable to extent and celerity of motion. Even the oblique or penniform direction of the fibres, apparent in the structure of almost every muscle, is a contrivance admirably adapted to augment their contractility, but still at the expence of power.

The force indoesinently expended in carrying the various thick and viscid humours of the animal body through the infinite ramifications of the very minute and almost capillary vessels of which it consists, must necessarily be immense, and its constant renovation is, indeed, a perpetual miracle.

Note K.---Page 46.

Man differs more from other animals in his habits respecting drink, than with regard to food. Animals living in a state of nature drink very sparingly. The carnivorous reject salt, which, indeed, appears to be a poison to them. The graminivori hardly require drink, except when urged by man to extraordinary exertion. The less fluid domesticated animals are

permitted to have, they are the more healthy, and the process of fattening, where that is an object, goes on the faster. The juice of fruit allays thirst more completely than any fluid, and if man ever subsisted upon fruits, which must have been the case if he lived without labour, he could have no occasion for drink.

The discovery and habitual use of agreeable and exhilarating liquors has tended more than any other invention of man to impair his primeval state of health. Against the ultimately deleterious effects of distilled spirits, there seems to be no provision made in the human frame, except indeed the innate dislike to their taste, which, however, the pleasing effects of inebriation soon obliterate. The habitual use of spirits blunts the moral sense, causes ferocity and cruelty of manners, and augments crimes, by destroying reflection, manifestly changes the expression of the countenance, and even alters the tone of the voice. The quantity of land devoted to the production of the grain from which spirits are manufactured, forms an insuperable barrier to the increase of population, as the habitual use of them does to the duration of individual life.

A comparatively small quantity of spirit forced into the stomach of a dog, a cat, or a hedge-hog, is productive of speedy death ; and a larger quantity is followed by the same effect in man. A quart of brandy, received into the human stomach at once, causes almost instant death, by destroying the life of that important organ. But the pre-eminence of the structure of the human frame is, in no respect, more signal than in resisting the effects of fermented and distilled liquors. I have remarked several instances of dogs acquiring the habit of drinking ale, and other strong liquors : in a very few months their faculties were impaired, they became bloated, were affected by mucous discharges from the eyes, and died of universal dropsy. The human constitution will bear, not indeed with impunity, the habitual use of the products of fermentation for a series of years, A large proportion of the diseases of mankind are derived from what they drink, and more than are at present suspected, in my opinion, from water itself. The *scelera aquarum* demand more attention than has been hitherto bestowed upon them. The ancients, aware of the importance of pure water to health, paid more attention to its qualities, and to the means of

obtaining supplies of good water, as the magnificent remains of their aqueducts sufficiently testify, than the moderns, notwithstanding all our boasted improvements.

The candid SYDENHAM expresses a fervent wish, that the use of spirits might be confined to their external application in burns, for which they are, doubtless, the best remedy; and the benevolent BOERHAAVE makes the following pathetic appeal: ‘To those who indulge in the use of inebriating liquors, a fatal necessity arises of repeating the dose. With the greatest commiseration I lately beheld a youth rising from his bed in the morning, pale, his cheeks flaccid, his hands trembling, his whole frame shaken every moment, by the violent palpitations of his heart; he could hardly move a limb, far less dress himself, until he had swallowed some ounces of distilled spirit. An endeavour to conquer this habit was productive of frequent syncopè, so that he was obliged to persist in it till he perished in the prime of life. Comment. 2. p. 137.

Note L.---Page 49.

Let not this eulogium on the medical character rest on my authority. The late excellent *Dr. Percival*, in his *Medical Ethics*, quotes the following passage from a letter he had recently received from the Rev. Dr. SAMUEL PARR : ‘ I have long been in the habit of reading on medical subjects ; and the great advantage I have derived from this circumstance is, that I have found opportunities for conversation and friendship with a class of men, whom, after a long and attentive survey of literary characters, I hold to be the most enlightened professional persons in the whole circle of human arts and sciences.’—Again, the same Reverend DIVINE observes, ‘ of the three liberal professions, I must confess, that in erudition, in science, in habits of deep and comprehensive thinking, the pre-eminence, in some degree, must be assigned to physicians.’

From the earliest authentic documents concerning the medical profession, which are the writings of HIPPOCRATES, we learn that physicians were, at

that period, accustomed to receive pecuniary recompences for their attendance on the sick. Particular directions are given concerning the conduct of practitioners in this respect towards the rich and the poor, and to strangers. The terms of medical remuneration have varied much at different periods of society. They ought always to be sufficient to induce men of regular education to undertake the office of physician, which can never be supported but as a lucrative one. The profession of physic, however useful it may be, is not the road to fame or glory. The character is still the same as described by VIRGIL in the persons of JAPIS.

Scire potestates herbarum usumque medendi
Maluit, et mutas agitare *inglorius* artes.

I met with an observation, made by BEN JONSON, in what he has called, ‘ Timber, or discoveries made upon men and matter,’ concerning the present subject, which is worth transcribing. ‘ The price of many things is far above what they are bought and sold for : *life* and *health*, which are both inestimable, we have from the *physician*, as *learning* and *knowledge*,

the true tillage of the *mind*, from our schoolmasters :
 But the fees of the one, or the salary of the other,
 never answer the *value* of what we received ; but
 serve to gratify their labours.'

Note M.---Page 52.

Galen is said to have reached the hundred and fourth year of his age. In his youth he superintended a gymnasium, or place for training the *athletæ*, whose dissolute lives he very feelingly reprobates. About the thirtieth year of his age, he adopted the regimen which he considered as most conducive to the preservation of health, after which he was never, during his whole life, affected with any disorder, except a fever of a single day's duration, produced by fatigue. His complexion remained fresh and his breath sweet till the day of his death.

ASCLEPEIADES was a physician in very high reputation at Rome, contemporary with Pompeius Magnus. His writings, it is much to be regretted, have all

perished, especially the book he addressed to King MITHRIDATES, (who is known to have attained a great age) on the means of preserving health ; his works are very frequently quoted by his successors, especially CELSUS, with much approbation. PLINY says of him, “ ASCLEPEIADI prusiensi, condita nova secta.—Sed maxime sponsione facta cum fortuna, ne medicus crederetur, si unquam invalidus ullo modo fuisset ipse : et victor, suprema in senecta lapsu scalarum exanimatus.’ C. PLINI. Hist. Nat. lib. vii. c. xxxvii.

ANTONIO COCCHI, an Italian physician, has collected every thing relating to Asclepeiates, and published a life of him, with a print from an ancient marble bust still extant. Firenze, Anno. 1758. He says,

‘Alcuni letterati moderni col dotissimo Fabricio asseriscono che Asclepejade visse cento cenquanta anni.’

Note N.---Page 54.

Of the philosophers of antiquity :—SOLON, THALES, PITTACUS, lived each more than a century.

ZENO, chief of the Stoics, attained the age of 98.

CLEANTHUS, his disciple, lived to be 99.

PLATO to 81.

ATHENODORUS, preceptor to Augustus, 82.

XENOPHON, the philosopher, warrior, and historian, died, aged 90.

LYCURGUS, 85.

SOPHOCLES, the tragedian, composed one of his finest plays after he had completed his century.

SOCRATES, the orator, died, æt. 106.

GEORGIUS LEONTINUS, 108.

VARRO, esteemed the most learned of the Romans, the friend of Cicero, must have lived to be nearly 100 years of age, as he is known to have died about 28 years previous to the birth of our Saviour. CARNEADES, esteemed by Cicero the most eloquent of men, poisoned himself at 90. This list might be greatly augmented by copying from the catalogue *Lucian* has left of the MACROBII.

Contemplating the term of life of these ancient sages and philosophers, who cultivated temperance,

in order to maintain the vigour of their intellectual faculties ; together with the long lives of many of the early Christian Fathers and holy men, who practiced abstinence from other motives, they appear almost to belong to another class of beings, than the common race of mortals, who, comparatively speaking, may truly be said to be swept away before they have seen half their days.

For much curious information respecting the subject of longevity ; vide, *Histoire des Personnes, qui ont vecu plusieurs siecles, et qui ont rajeuni : avec le secret du rajeunissement tiré* D'ARNOLD DE VILLENEUVE. *Et des Regles pour se conserver en santé et pour parvenir a un grand age.* Par MR. DE LONGEVILLE HARCOUET. Paris, 1716.

Note O.---Page 59.

HIPPOCRATES says, *ἰσχυρὰ φύσις ἰστέσι*,—*Naturæ Morborum medicatrices*. To which words SYDENHAM, certainly one of the best practical physicians this country ever produced, adds the following succinct commentary,—‘ Non aliam arti demandat provin-

ciam quam *ut deficiente naturæ succurrat, effrenam coerceat, et in ordinem redigat.* Atque hæc omnia peragit natura paucissimis, simplicissimisque, adjuta remediorum formulis, alicubi etiam prorsus nullis.'

“Hoc, quod interdum unicum auxilium superest, nequaquam ita accipi velim, tanquam quod non imprimis necessarium est in omnium morborum curatione. De quo quidem præcepto, cum permagni refert ad ægrotantium salutem, paulo fusius disserere libet.

Τὸ ἐνοεμῶν—ψυχὴ—Archæus—spiritus animales—Natura —— His et aliis quibusdam vocabulis usi sunt medici ad designandum principium illud vitæ, sive incognitam ἐνέγγειαν, qua animantia ab inanimatis distant.—In physiologia, et in pathologia humani corporis explicanda, modo haud satis, modo nimium tributum est principio et fonti vitæ animalis.

GUL. HEBERDEN MORBORUM HISTORIA.

Note P.---Page 61.

BLUMENBACH, in his work de *GENERIS HUMANI varietate nativa*, has enumerated the peculiarities in structure, functions, and diseases, by which man is distinguished from other animals. Among which he mentions,—*Stature erect*,---*Hands two*,---*Pelvis broad and deprest*,---*Teeth meeting in horixontal contact*.---A human being alone is possessed of proper *nates*.---*Membrana hymenis* sequiori sexui propria ; ut et *frænum præputii* viro. The softness and flexibility of the cellular texture is peculiar to man, and probably enables him to sustain, with impunity, every variety of climate ; man is *omniverous* ; he alone is possessed of the faculty of *reason*, and *articulate speech* ; and capable of laughter and weeping.

Diseases peculiar to the human species are ;

Of the eruptive kind.

<i>Variolæ.</i>	<i>Morbilli,</i>
<i>Scarlatina,</i>	<i>Miliares,</i>
<i>Petechiæ,</i>	<i>Pestis.</i>

Hæmorrhages,

Epistaxis ? Hæmorrhoides, Menorrhagia.

Diseases of the nervous system.

<i>Hypochondriasis,</i>	<i>Hysteria,</i>
<i>Mania,</i>	<i>Melancholia,</i>
<i>Satiriasis,</i>	<i>Nymphomania,</i>
<i>Nostalgia,</i>	<i>Crelinismus</i>
<i>Asthma Spasmodicum ?</i>	

Constitutional Complaints.

<i>Rachitis,</i>	<i>Scrofula,</i>
<i>Lues venerea,</i>	<i>Lepra.</i>

Local Diseases.

<i>Amenorrhæa,</i>	<i>Cancer ?</i>
<i>Clavus,</i>	<i>Hernia congenita,</i>
<i>Herpes,</i>	<i>Tinea capitis</i>
<i>Solus etiam inter tot animalia ructat.</i>	

*Heu mihi ! tot mortes homini quot membra ; malisque
Tot sumus infecti, mors ut medecina putetur.*

*Sed meliora speramus ;
Et quoniam variant morbi, variabimus artes ;
Mille mali species, mille salutis erunt.*

Note Q.---Page 64.

It is remarkable, that in describing the creation of man in the image of the Deity, and enunciating his dominion over all other animals, OVID makes use almost of the very phrases of Scripture.

Sanctius his animal, mentisque capacius altæ,
Deerat adhuc, et quod dominari in cætera possit.

Natus homo est :—

Finxit in *effigiem* moderantum cuncta *Deorum* ;
Pronaque cum spectent animalia cætera terram,
Os homini sublime dedit : cælumque tueri
Jussit. Et erectos ad sidera tollere vultus.

The term *Deorum* evidently coincides with the plural termination of the Hebrew *Elohim*, significative of the personified form of the Deity. MILTON, well versed in the original language of Scripture, appears sedulously to employ the same plural style, in detailing the creation of man.

‘ Let us make now Man in *our* image, Man
In *our* similitude, and let them rule
Over the fish and fowl of sea and air,
Beast of the field, and over all the earth,

And every creeping thing that creeps the ground.
 This said, he formed thee, Adam, thee, O man !
 Dust of the ground, and in thy nostrils breathed
 The breath of life ; in his own image he
 Created thee, in the image of God
 Express, and thou becam'st a living soul.'

Note R.--Page 65.

The fear of death has, at all times, rendered mankind prone to believe that life might be prolonged by medicine, and designing men have been ever equally ready to profit by this credulity. But all the elixirs and balsams which have been vaunted by their authors as possessing the power of renovating or restoring life, whether in ancient or in modern times, have turned out to be stimulating or narcotic drugs, by the use of which the duration of human existence has, in fact, been abridged. When the art of distilling spirits, generally attributed to RAYMOND LULLY, was discovered, the secret of longevity was supposed to be brought to light, the *Mercurius volatilis* to be at length fixed, and the pernicious product received the name of *aqua-vitæ*, the liquor of life. A discovery concerning which it would be difficult to determine whether it has tended most to diminish the happiness,

or shorten the duration of life. In BARROW's travels in China, an account is given of a man of the name of LAO KING, who soon after the time of CONFUCIUS attempted to introduce the worship of the Lama into China, and founded a sect which he called TAO-TZE, or the sons of the immortals. He persuaded his disciples that he possessed the secret of preparing a liquor which would confer immortality on those who partook of it. Many were persuaded to drink of this beverage, which seldom, indeed, failed to introduce them to the company of the immortals. The liquor was probably composed of opium, bang, and other narcotic drugs, which, by stimulating the system, produced a temporary exhilaration of spirits; but the succeeding languor rendered another and another draught necessary, till at length the excitability being totally exhausted, the disciple put on immortality.'—So numerous were the victims of this delusion, that it became necessary to put an end to the practices of the impostor by a public edict. This anecdote is a good illustration of the Eastern apologue, "that the cup which confers immortality must always be preceded by a draught from that of oblivion." And the truth of LORD BACON's *canon* still remains unim-

peached. ‘*Curatio morborum temporariis eget medicinis ; at longævitæ vitæ expectanda est a diætis.*”

From the perusal of no small number of the writings of the **ADEPTS**, I think I have made out that by their *radical moisture, fifth element, acidum pingue*, &c. they, in fact, meant the plastic power of life. And the grand secret of those who had any real meaning, [for many of the works attributed to the hermetic sect are mere rhapsodies of nonsense published by impostors who imitated the mystical manner of writing for the purpose of deception] consisted in extending the operation of this plastic principle to minerals also, which they conceived to possess a faculty of propagating their species analagous to animal reproduction. To discover the means of effecting this purpose, appears to have been the object which the genuine professors of the hermetic art veiled under a variety of mysterious allegories, all having an allusion more or less remote to the process of generation. Vide **APHORISMI URBIGERANI**, or the secret of secrets. **THE HERMETIC ROMANCE**, or **CHEMICAL WEDDING**, by **CHRISTIAN ROSENCRANTZ**.

ESSAY ON THE PHILOSOPHER'S STONE, by an ADEPT.
DIADEMA PHILOSOPHORUM, HEYDON, &c.

Note S.—Page 69.

The Elephant alone rivals, or perhaps exceeds, man in duration of life. As a proof that the term of life is in general limited by the decay of the teeth, a peculiar provision is found to exist in that animal for the purpose of renewing them. The grinding teeth, or molares of the elephant, which consist each of a single piece of bone intermingled with enamel, are so constructed as to continue growing from behind, in proportion as they are worn away in front, by the process of mastication, so that their duration is coeval with that of the animal. Human teeth resist decomposition, after death, for a much longer period than any other part of the body. In a church-yard, lately dug into near Perth, after an interval of 200 years, a great number of perfect teeth were found; and a majority of the skulls examined, which must have been those of persons of various ages, were observed to possess their proper complement of sound teeth. Hence it may be inferred that the premature decay of the teeth, now so general, must originate in some

peculiarity in the present mode of living, perhaps in the prevalent and increasing use of hot fluids.

It hath been inscribed upon a cenotaph erected to the memory of MICHAEL DE MONTAIGNE, that 'he left nothing unsaid ;' and we should be more ready to allow that the following admirable estimate of the value and importance of health was never exceeded, if we could entirely forgive him his well known contempt for medicine and its professors.

' Que les medecins excusent un peu ma liberté : car par cette mesme infusion et insinuation fatale, j'ay receu la hayne et le mespris de leur doctrine. Cette antipathie, que j'ay à leur art, m'est hereditaire. Mon pere a vescu soixante et quatorze ans, mon ayeul soixante et neuf, mon bisayeul pres de quatre vingts ans, sans avoir gousté aucune sorte de medecine. Et entre eux, tout ce qui n'estoit de l'usage ordinaire, tenoit lieu de drogue. La medecine se forme par exemple et experience : aussi fait mon opinions. Voila pas une bien expresse experience, et bien avantageuse ?——

' C'est une pretieuse chose que la santè ; et la seule

qui merite a la verité qu' on y employe, non le temps seulement, la sueur, la peine, les biens, mais encore la vie à sa poursuite : d'autant que sans elle la vie nous vient a estre injurieuse. La volupté, la sagesse, la science, et la vertu, sans elle se ternissent et esvanouissent. Et aux plus fermes et tendus discours que la philosophie nous vueille imprimer au contraire, nous n'avons qu'a opposer l'image de Platon, estant frappé du haut mal, ou d'une apoplexie : et en ceste presupposition le deffier d'appeller a son secours les riches facultez de son anie. Toute voye qui nous meneroit a la santé ne se peut dire pour moy ny aspre, ny chere.—La santé, dis-je, le plus beau et le plus riche present, que Nature nous sçache faire.

Edit. Paris, 1608.

The following little Ode, if it should not be found to breathe the purest inspiration of the Lesbian Lyre, bears on it the stamp of truths, independent of the solemn authority with which they are in some measure invested, that will be found to come home to the business and bosoms of men, in exact proportion as the precepts which it inculcates shall have been neglected or otherwise.

Æque neglectum pueris scñibusque nocet.

CARMEN SAPPHICUM

depromptum

EX ECCLESIASTICO, CAP. XXX.

AUCTORE THOMA COGAN.

QUISQUIS optata fruitur salute,
 Sit licet pauper, tamen hic potenti
 Diviti præstat, mala quem flagellat
 Invaletudo.

Præstat argento, superatque fulvum
 Sanitas aurum, superatque census
 Quamvis ingentem, validæque vires
 Omnia præstant.

Vita languescens properante morte
 Pejor est multo ; requiesque dulcis
 Anteit longè miserum dolorem
 Corporis ægri.

Si sapis quæres igitur salutem ;
 En tibi portus patefit salutis,
 Hunc tene, salvus fruire et salute :
 Vive valéque.

THE HAVEN OF HEALTH. 1605.

In his brief preface to the *HISTORIA VITÆ ET MORTIS*, LORD BACON, who evinced a degree of knowledge and wisdom far beyond that of the age in which he lived, betrays a sufficient consciousness of that superiority, and shows himself by no means insensible of the neglect of his contemporaries ; appealing, with a well-founded confidence, to the suffrage of posterity for a just estimate of his character ; and asserting, at the same time, in language equally dignified, the respect which he conceived to be due to the liberal professors of *MEDICAL SCIENCE*. It is not without something like gratitude, as well as from the general respect due to his memory, that I insert the entire passage, as containing moreover the best apology I can offer for the present attempt.

Viventibus et Posteris salutem.

Cum historiam vitæ et mortis, inter sex designationes menstruas ultimo loco posuerimus ; omnino hoc prævertere visum est, et secundam edere, propter eximiam rei utilitatem ; in qua, vel minima temporis jactura pro pretiosâ haberi debet. Speramus enim et

cupimus futurum, ut id plurimorum bono fiat ; atque ut medici nobiliores animos nonnihil erigant, neque toti sint in curarum sordibus ; neque solum propter necessitatem honorentur, sed fiant demum omnipotentiae et clementiae divinae administri, in vita hominum proroganda et instauranda ; praesertim cum hoc agatur per vias tutas et commodas et civiles, licet intentatas. Etsi enim nos Christiani ad terram promissionis perpetuo aspiremus et anhelemus ; tamen interim itinerantibus nobis in hac mundi eremo, etiam calceos istos et tegmina (corporis scilicet nostri fragilis) quam minimum atteri, erit signum favoris divini.

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26

